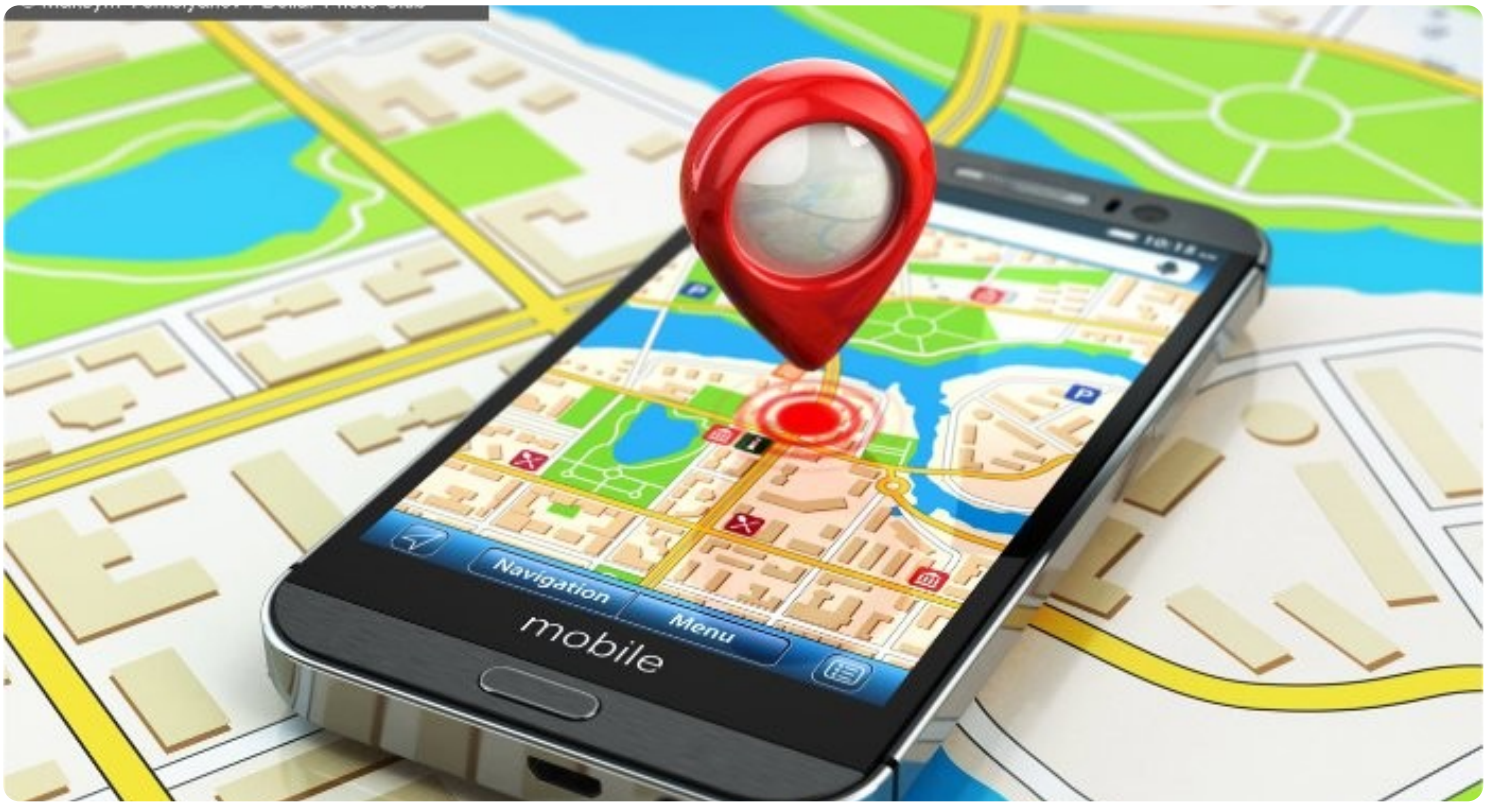

Gamification and Sustainable Mobility

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What have we learnt and how do we move forward?

This article is the eighth in a series of invited articles developed for Swinburne University as part of a Learning Transformation initiative aimed at enhancing student learning outcomes in sustainable transport

Raising Awareness - Changing Attitudes

Urbanization jointly considered with the current growth rates in car ownership form

a more sustainable way of traveling is one of the major challenges in transportation with far reaching effects to climate change and quality of life. Nowadays, with Information Communication and Technology (ICT) solutions and especially the smartphones, it is possible to deliver accurate mobility-related information to users to make smart travel decisions with the aim to reduce congestion and air pollution or improve safety. However, delivering mobility-related information is necessary, but not sufficient condition for initiating behavioral changes: this can only be achieved, if the communicated information targets to influence the attitudes, and motivators of road users. But, how can we persuade users to change their behavior?

Gamification: What it is, How it Works, and Why it Works?

Gamification is a useful tool to trigger behavior change. Gamification is the application of game-oriented design approaches and game-inspired mechanics (for example point scoring, leaderboards, methods to measure achievements) to originally non-game contexts, such as transportation and mobility.

An effective gamification framework is based on a series of metrics to quantify the success on a predetermined goal, which is achieved through a set of tasks. Based on the metrics, users gain feedback about their performance and achievements. Users may also communicate with others, compare their performance and compete. To improve performance, users may need to change their mobility patterns and undertake different behavior or perform alternative tasks.

Gamification is destined to work for a simple reason: it may transform a simple, boring everyday task to a fun-to-do undertaking. It gives new purpose to everyday habits and challenges users to compete with others, improve their status and excel. Users become aware of the effects of their behavior to the environment and transportation system.

A typical example of gamification is **Waze**, the largest community-based traffic and navigation app. In Europe, some prominent examples are the **Chromaroma** project, a London's Oyster card powered travel game; **Mobi**, a system which targets modal shift through gamification promoting smart mobility to employees; **tripzoom**, an app to improve the personal mobility and share information; the **superthub** project, a multi-

options with Recoins.

Drivers for Success

If the users are not willing or interested in gathering their mobility information, gamification will not be effective. Therefore, questions, such as *"Who are the players and how to engage them? What information they need?"* are critical.

Incentives are important in mobility games. Some popular incentives are:

- Save time and money
- Receive information and optimize trips,
- Achieve (social) recognition for being eco-friendly, healthy etc.

Special attention should be given to the uniqueness in mobility behavior, as well as the perceptions and beliefs of travelers. The more flexible the gamified design - in terms of metrics and tasks involved - the greater the short and long run acceptance by the users, the more likely the behavioral change.

In mobility games, a good transportation planner thinks like a game designer, and a good mobility game provides players a sense of autonomy and control and not only gets players to play, but also keep them playing. Rewards of any type are important and should be tangible, unexpected and performance contingent.

Finally, a holistic manner to think of transportation systems is required. Mobility behavior changes are linked to the possible alternatives and are constrained by cost, availability of a specific mode, familiarity etc. If no feasible alternatives exist, gamification will have limited or no effect to transportation systems.

The Future

The **Forum for Future** introduces four scenarios on how future cities may evolve related to car use and other mobility alternatives. Gamification-based solutions have great potential for engaging citizens in sustainable mobility. In this framework we need to:

managing urban mobility incorporates several conflicting goals. Integration of all interacting systems (from transportation to government services, business, healthcare etc) will help develop holistic mobility solutions. Urban planning and mobility management is to evolve from the classic top-down thinking to a more user-centric perspective. In this framework, synergies between users, public authorities and city transportation providers are crucial.

Understand the role and possibilities produced by ICT

ICT is considered to be a strong enabler for the new traffic management paradigms. ICT also brings three new challenges:

- Developing open data policies to foster innovation and public engagement.
- Delivering services tailored to lower income users and enhance social equity.
- Introducing a legislative framework for addressing privacy and security issues.

Introduce New Educational Paradigms

The new transportation landscape will eventually challenge the role of Transportation engineers. Transportation researchers and practitioners should be able to cope with the demanding technical and algorithmic aspects of transportation applications in smart cities. The aim is not to replace other disciplines, but to be able to produce transportation engineers that understand and efficiently use the full potential of ICT applications and the accompanying modeling tools.

What do you think?

1. Have you used any of the gamification apps listed in this article, e.g. **Waze**? Would you find it useful?
2. Who benefits from gamification in transportation and in which way?
3. How ready are authorities and transportation providers to incorporate gamification to their everyday operations? What will be the challenges?

5. Are there any shortcomings or uncertainties to mobility games?

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